

## BNL test electron beam ion source operation on a 100 kV platform (abstract)<sup>a),b)</sup>

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At BNL, we are preparing to build an electron beam ion source (EBIS) that will satisfy the requirements of the relativistic heavy ion collider (RHIC), e.g.,  $\text{Au}^{32+}$  ions of about  $3 \times 10^9$  particles/pulse in 10–40  $\mu\text{s}$  pulses at 5 Hz. In addition, the EBIS is required to deliver beams such as  $\text{He}^{2+}$ ,  $\text{C}^{6+}$ ,  $\text{O}^{8+}$ ,  $\text{Si}^{14+}$ ,  $\text{Ti}^{18+}$ ,  $\text{Fe}^{21+}$ , and  $\text{Cu}^{22+}$  in  $\sim 2\text{--}3$  mA, 10  $\mu\text{s}$  pulses at 5 Hz to meet the demands of the NASA Space Radiation Laboratory (NSRL) experimental program. Development studies continue to be carried out on the BNL test EBIS, a half-length full electron beam power prototype of the RHIC EBIS which is in the construction phase. In preparation for acceleration of EBIS ions by a radio frequency quadrupole, we have upgraded the test EBIS for operation on a nominal 100 kV pulsed platform to allow seed ion injection at 10–20 kV and ion extraction up to 100 q kV. The installation includes a pulsed high voltage power supply, a 200 kV A 100 kV isolation transformer, and a capacitive electron collector supply and electron gun bias supply which allows operation in a similar mode to the RHIC EBIS design. Initial testing has been made using ion beams of  $\text{He}^{2+}$  and  $\text{Ar}^{10+}$  formed from gas injection and ions have been extracted with energies up to 88 q keV. Total ion current measurement has been made and charge state distributions have been obtained using a Mamyrin time of flight. Results of emittance measurements and profile distributions, obtained at various energies using both pepperpot and slit-foil emittance meters, will be presented. © 2008 American Institute of Physics. [DOI: [10.1063/1.2821594](https://doi.org/10.1063/1.2821594)]

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